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period, for history was in the making in these turbulent waters and along these sequestered shores long before the Gloucesterman was conceived. The purpose of this notice is not to direct attention to the scientific analysis of the fishing business, into which it does not purport to enter, but to applaud the worth and fitness of this contribution to the historic development of the oldest known industry on the North American continent and to congratulate the author on the attractive manner in which he has presented his subject. As an official document it bears the cachet of dignity and the assurance of durability.

JOHN M. CLARKE

NOTES ON METEOROLOGY AND CLIMATOLOGY

CLIMATOLOGY AT THE ASSOCIATION OF AMERICAN GEOGRAPHERS

At the tenth annual meeting of the Association of American Geographers at Princeton, N. J., January 1 and 2, 1914, six climatological papers were presented:

The Weather Element in American Climates:

R. DEC. WARD.

Since American climates are chiefly made of cyclonic weather, this factor is all-important; the actual conditions affect us and not the averages. Winter is a cyclonically-controlled period—at this time of year practically the whole country is covered with cyclonic paths. In summer, solar control is uppermost, the cyclone paths are in the north and the cyclones weak. Thus cyclone paths migrate with the sun. As the distribution of meteorological elements in a cyclone is different in different parts of the country, Professor Ward is preparing regional cyclonic weather types for the United States.

The Frostless Period in Maryland and Delaware: OLIVER L. FASSIG.

The number of days (average of 20 years) between the last severe frost or freezing temperature in the spring and the first in the fall ranges from 130 days in the west to over 200 days in the immediate vicinity of Chesapeake Bay. For further study of plant growth as related to climatic conditions, phenological

observations of similar plants in the same soil (transported) are to be undertaken at many points, each group being visited every 10 or 15 days.

Storm Frequency in the United States and Europe: C. J. KULLMER.

A geographical study of cyclone frequency of the United States 1874 to 1891 and of Europe 1876 to 1891 shows irregular or perhaps periodic latitude variations of cyclone frequency. An attempt was made to correlate these latitudinal changes with the eleven-year periodical latitude change of sun-spot belts. Such changes of cyclone frequency are probably accompanied by rainfall and temperature variations.

The Pleionian Variations of Temperature: HENRY ARCTOWSKI.

Swings of temperature covering a year or more seem to be the result of periodic fluctuations in the solar constant plus variations caused by volcanic dust in the atmosphere. This coincides with the results obtained by Abbot and Fowle and many others.

Climate and Human Efficiency: ELLSWORTH HUNTINGTON.

From a study of the piece-work wages of 270 operatives in some Connecticut factories, 1910-1912, it was found that their maximum efficiency came in December with a secondary maximum in May. The minimum of about 85 per cent. of the maximum came in January and another of about 90 per cent. in August. Highest efficiency usually occurred with out-of-door temperatures near 58° (F.), and with wide variations of temperature from one day to the next. Other meteorological elements considered individually in this connection gave no satisfactory results. Further work will be done to compare mental efficiency with weather.

The Snowfall About the Great Lakes: CHARLES F. BROOKS.

The snowfall in this region is heavy because of much moisture precipitated at low temperatures by the many winter cyclones. On account of the cooling action of land on the prevailing west winds blowing across the lakes, the east shores get more snow than the

west. Ice on the lakes by diminishing evaporation reduces the snowfall of the leeward shores. Thus the heaviest snowfall comes early in winter on the east shores in marked contrast with the late winter maximum on the west shores.

THERMOMETER EXPOSURE

DR. W. KÖPPEN in the *Meteorologische Zeitschrift*, October and November, 1913,¹ has presented the results of a long study of thermometer exposure in different parts of the world with many shelters. His results are briefly stated below. To determine air temperature the thermometer must be sheltered from radiation but not from the air; the air must not travel far between radiators before reaching the thermometer, and the shelter must have low specific heat and be a poor conductor. The English (Stevenson) shelter in the small form of 1883 fulfills the above stipulations very well. But to eliminate the effect of heating by the sun and excessive cooling at night, a screen is necessary. Dr. Köppen proposes a small and simple screen of grass, rushes, brush or palm leaves to be set over the shelter in such a way as to exclude sunlight when the sun is more than 20 degrees above the horizon. The roof of the shelter should be of this material also. As the small Stevenson shelter is too small for the ordinary thermograph and hygograph, a combined instrument is suggested instead. Since the English shelter is extensively used, these modifications proposed by Dr. Köppen to obtain strictly comparable temperature data can be made with facility.

CHANGES OF CLIMATE

PROFESSOR J. W. GREGORY, of Great Britain, presented a paper entitled "Is the Earth Drying Up?" before the Royal Geographical Society, December 8, 1913.² Of the three

¹ "Einheitliche Thermometeraufstellung für meteorologische Stationen zur Bestimmung der Lufttemperatur und Luftfeuchtigkeit," pp. 474-487, 513-523, 1 plate.

² Review by "E. G.," *Nature*, London, December 11, 1913, p. 435.

general views in this matter, the first (Prince Kropotkin) maintains that the earth has a general tendency towards drought; the second (Professor Ellsworth Huntington) that while there is this general drying the more important changes are pulsatory, and the third (Mr. R. Thirlmere) that climate varies in cycles of 2,000 years or more and that we are now cooling. Professor Gregory put the evidence from different countries on a map. The result shows probable desiccation in historic times in Central Asia, Arabia, Mexico and South America; but increased rainfall in the United States of America, Greenland, Sweden, Roumania and Nigeria. There seems to have been no appreciable change in Palestine, North Africa, China, Australia and by the Caspian Sea. Thus while there seem to have been local variations there has been probably no general change in climate in the historic past. At any rate, no great universal change could be expected without a considerable change in land and water distribution or of the intensity of solar radiation.

AIR MOVEMENT IN THE CIRRUS LEVEL

THE geophysical institute of the University of Leipzig has recently issued a work by Th. Hesselberg, "Die Luftbewegungen im Cirrus-niveau."³ From comparison of the tracks of cyclones and anticyclones with the stream lines shown from cirrus observations, the following results have been obtained. Cyclones and moving anticyclones move in the same directions as the air in the cirrus level over the center. The velocity of movement of cyclones and anticyclones is in the mean 0.2 to 0.4 of the velocity of air in the cirrus level. The relative velocity is smaller the deeper the minimum and the higher the maximum.

Air movement in the cirrus level seems to be controlled by the pressure and temperature conditions on the earth. The more intense the cyclone or anticyclone and the smaller the horizontal temperature gradient the greater is its effect on the currents above. The disturbance which a cyclone makes on the cirrus path

³ Second Series, Vol. 2, 73 pp., 48 maps, Leipzig, 1913.

works back onto the track of the cyclone. Thus a cyclone may have loops in its path.

JOURNAL OF THE SCOTTISH METEOROLOGICAL SOCIETY

THE annual volume (Vol. XVI., 3d Series, XXX.) of this society including rainfall returns and meteorology of Scotland for 1912 has recently appeared. There are seven special articles. Agricultural meteorology is touched in three—Dr. W. N. Shaw, "On Seasons and Crops in the East of England" (pp. 179–183), A. Watt, "On the Correlation of Weather and Crops in the East of Scotland" (pp. 184–187), and Dr. H. N. J. Miller, "The Composition of Rain Water Collected in the Hebrides and in Iceland, with Special Reference to the Amount of Nitrogen as Ammonia and as Nitrates" (pp. 141–158). Dr. Shaw has another article, "Upper Air Calculus and the British Soundings during the International Week (May 5–10, 1913)" (pp. 167–178). The other papers are—M. M'C. Fairgrieve, "A Possible Two-hourly Period in the Diurnal Variation of the Barometer" (pp. 158–166), Dr. E. M. Wedderburn, "On the Appearance of the Surface of Fresh-water Lochs in Calm Weather" (pp. 189–193), and Dr. G. A. Carse, "Note on Atmospheric Electric Potential Results at Edinburgh during 1912" (pp. 188–189).

NOTES

ON January 1, 1914, the United States Weather Bureau began to issue daily weather maps of the Northern Hemisphere with pressures indicated in millibars and temperatures in Absolute Centigrade degrees. This map is printed on the back of the usual Washington weather map of the United States.

THE Central Meteorological Bureau of France has created a special forecast service for aeronauts.

MR. R. C. MOSSMAN, of the Argentine Weather Service, is acting editor of *Symons's Meteorological Magazine* and director of the British Rainfall Association during the temporary absence of Dr. H. R. Mill on account of ill-health.

THE Italian Meteorological Society will hold an international congress in Venice in September, 1914. The higher atmosphere, climatology, aerology, meteorology and maritime meteorology will receive particular attention.

IN connection with studies of air currents, pilot balloons are used extensively in Germany. Vertical currents are determined by comparing the observed rate of ascent of the balloons with the theoretical. The turbulent meeting planes of opposing vertical currents are usually marked by clouds.⁴

THE daily synchronous weather charts of the southern part of the Southern Hemisphere, October 1, 1901, to March 31, 1904, compiled from the observations of ships and the numerous Antarctic expeditions give the first extensive (though general) information concerning the cyclones of the south temperate and sub-antarctic zones. The paths of these cyclones lie far south, particularly in summer, when they are beyond latitude 60 degrees. The average rate of progression is about 20 kilometers per hour—about the same as ocean cyclones elsewhere.⁵

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SPECIAL ARTICLES

THE SYSTEMATIC POSITION OF THE ORGANISM OF THE COMMON POTATO SCAB

SCAB is probably the most widely distributed disease of the potato tuber. We are indebted to Professor Roland Thaxter for associating a specific organism with the cause of this disease. His description of the morphological and biological characters of this organism are so careful and his substantiation of the same as causal agent, so conclusive, that we are unable to add anything of material importance—at any rate here—from our own study of the organism.

Professor Thaxter named the organism *Oospora scabies*¹ by which "provisional"

⁴ Dr. A. Peppler, *Deutsche Luftfahrer Zeitschrift*, November 26, 1913, pp. 578–580.

⁵ See *Nature*, London, December 4, 1913, pp. 393–395.